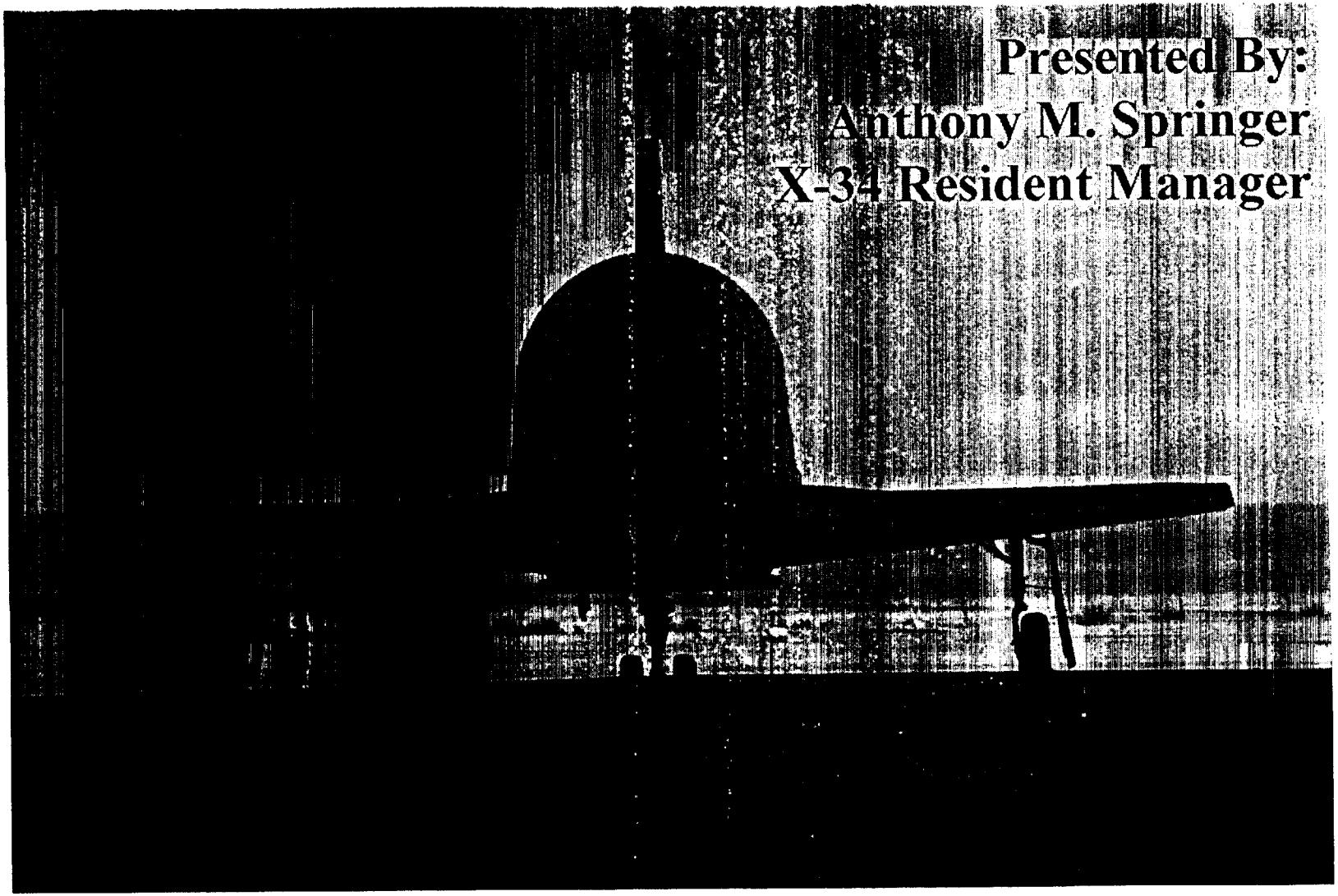
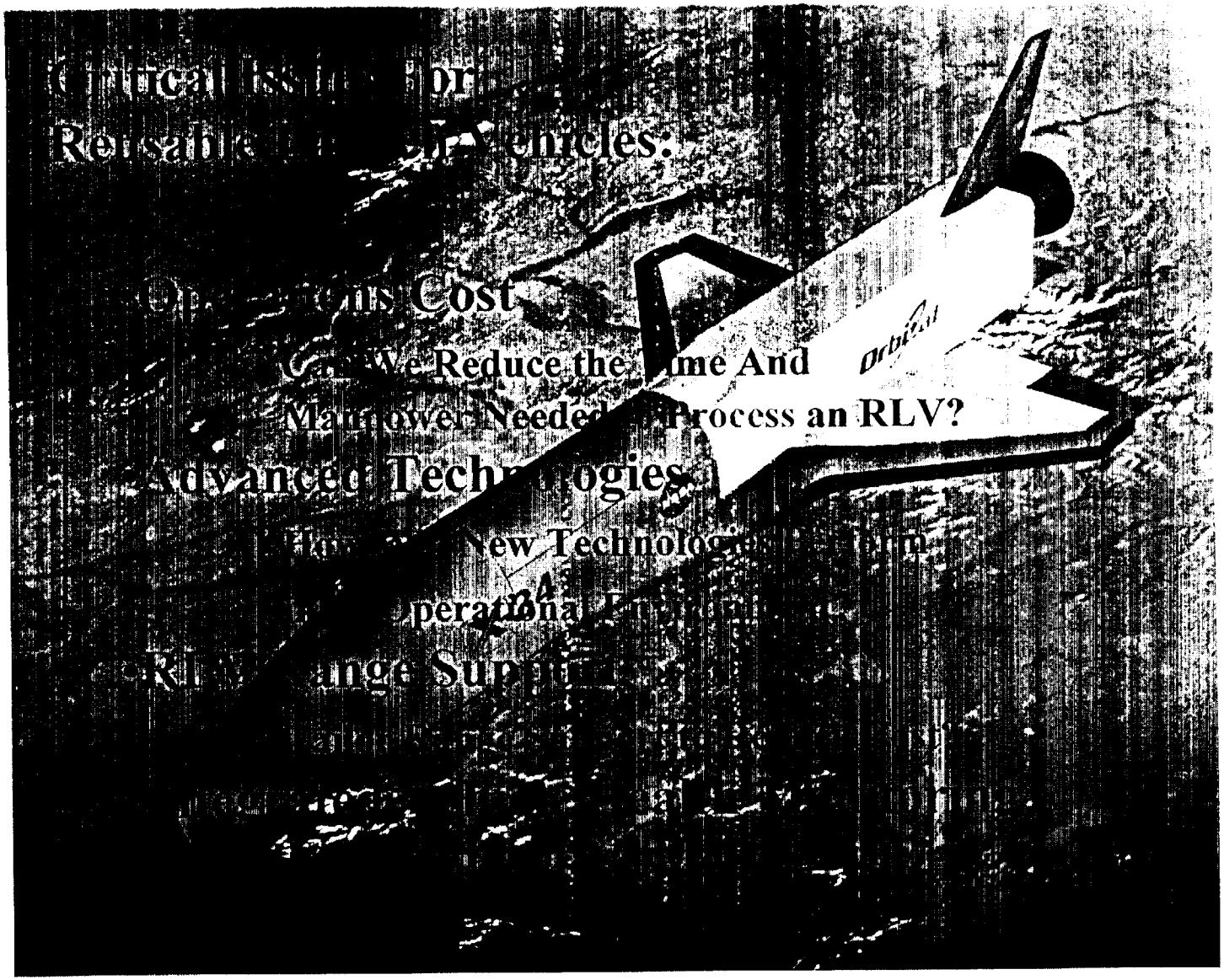
X-34 Project



X-34 Project



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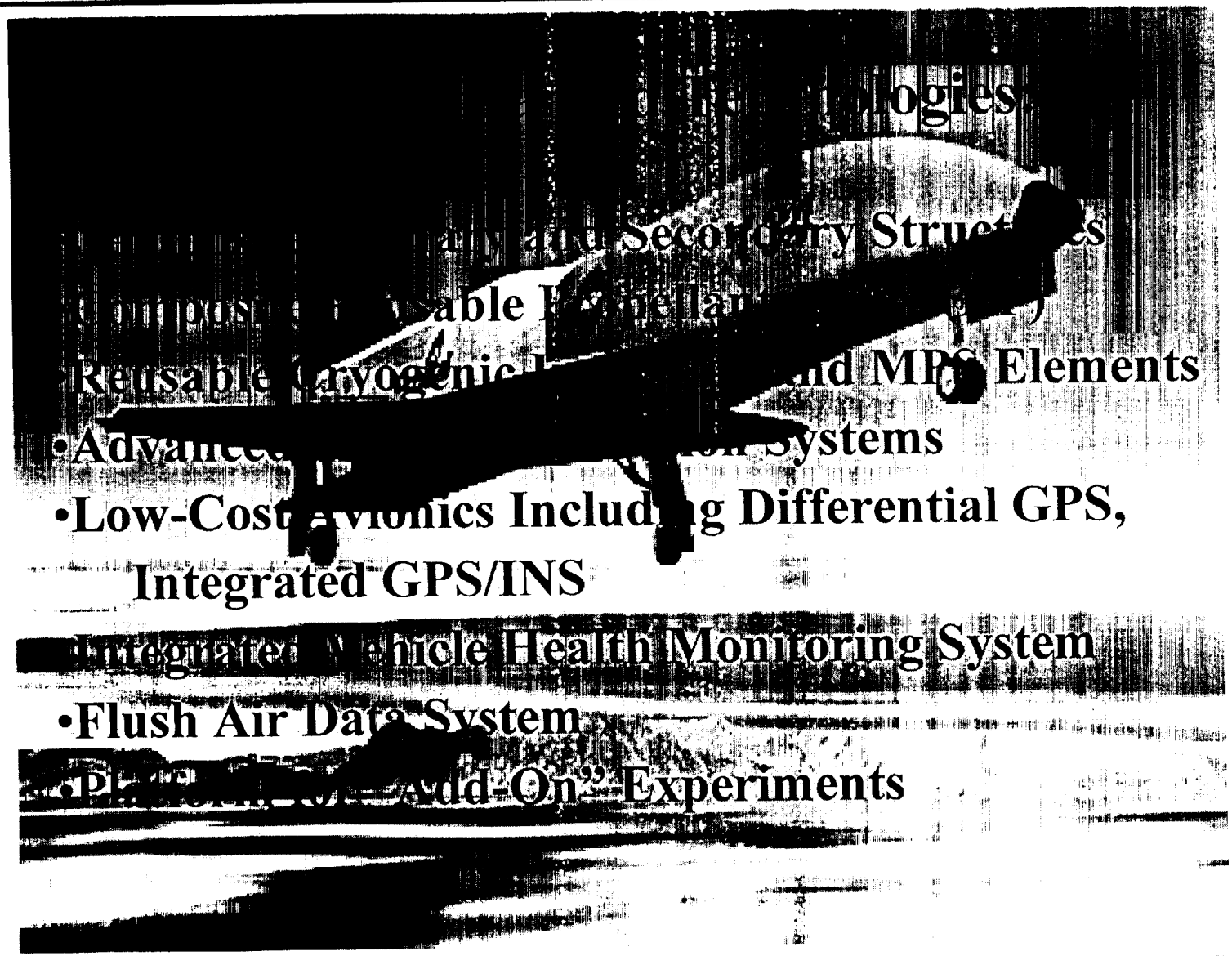
X-34 Project



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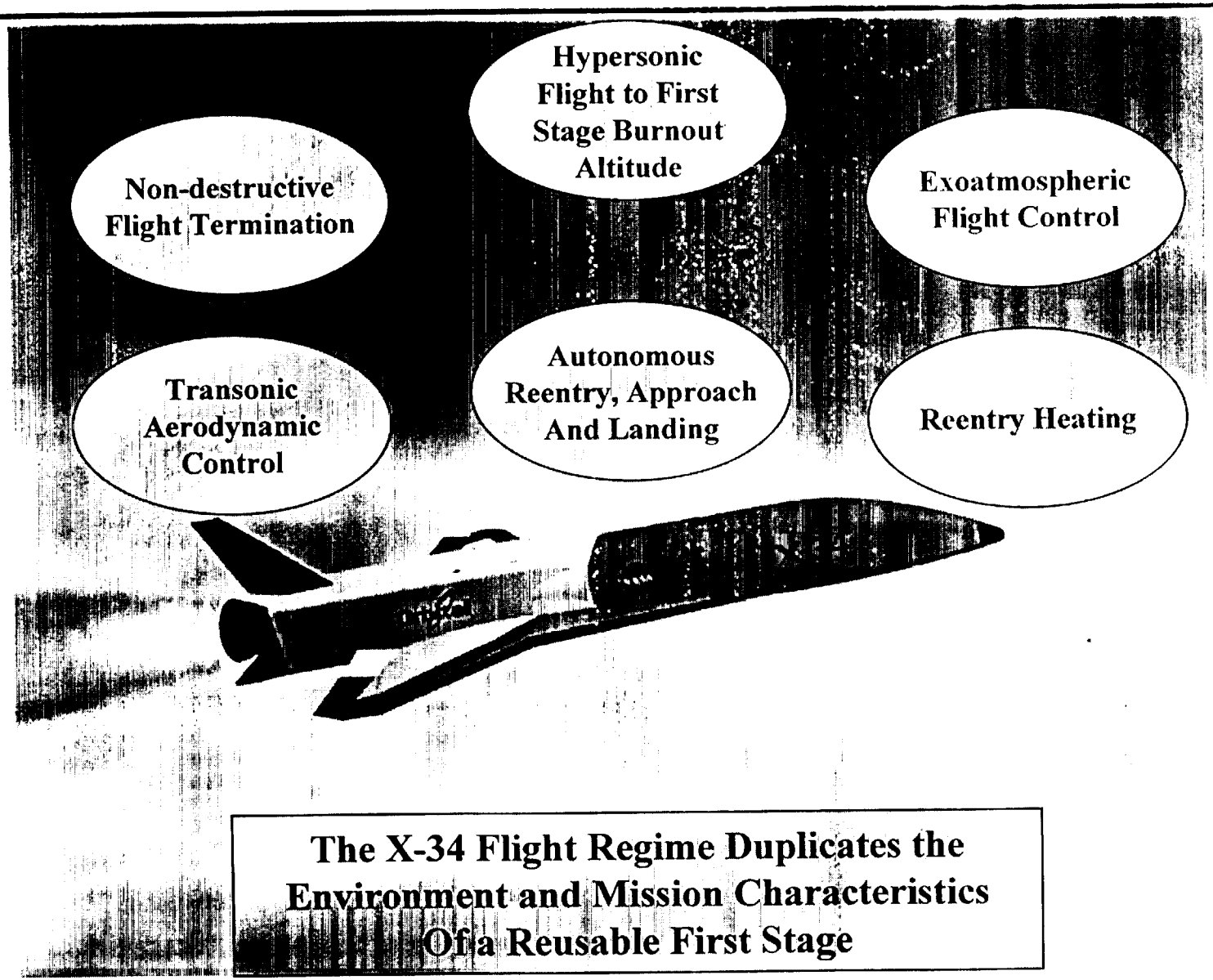
X-34 Project


X-34 Flight Regime Duplicates Environment
and Mission of Reusable First Stage
-34 Demonstrates
NS/GPS and DGPS
Integrated Vehicle Health Monitoring (IVHM)
Fast Turn Around, Simplified Maintenance
Fewer People, Lower Cost, Simplified Operations

X-34 Project



The X-34 Flight Regime Duplicates the Environment and Mission Characteristics Of a Reusable First Stage

X-34 Project

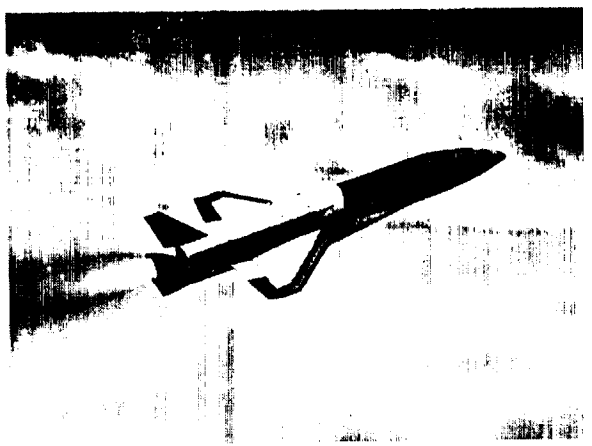
Vehicle Description

•Single Stage, Sub-Orbital, Fully Reusable, Unmanned Testbed Aerospace Plane

• Vehicle Characteristics

Length	58.3 ft
Wing Span	27.7 ft
Gross Weight *	47,500 lbs
Fuel *	30,500 lbs
Payload *	400 lbs
Operating Weight Empty *	16,500 lbs

* Approximate Values



•Airframe

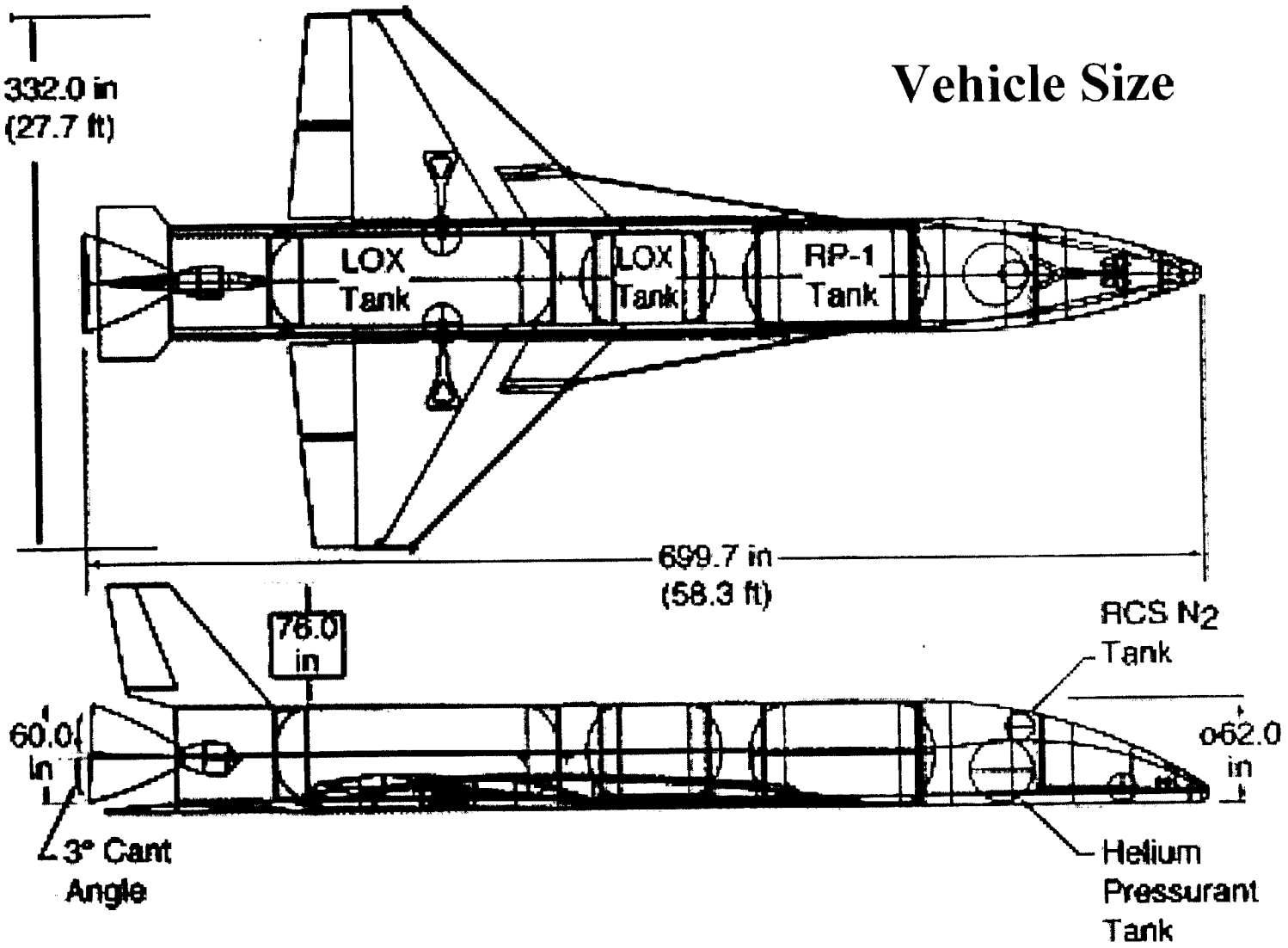
Composite structure and skin
One piece wing with center carry through structure
Elevon control surfaces
All-flying vertical tail
Body flap for pitch axis trim

•Avionics

Single string with exception of dual string flight termination system

X-34 Project

Vehicle Size



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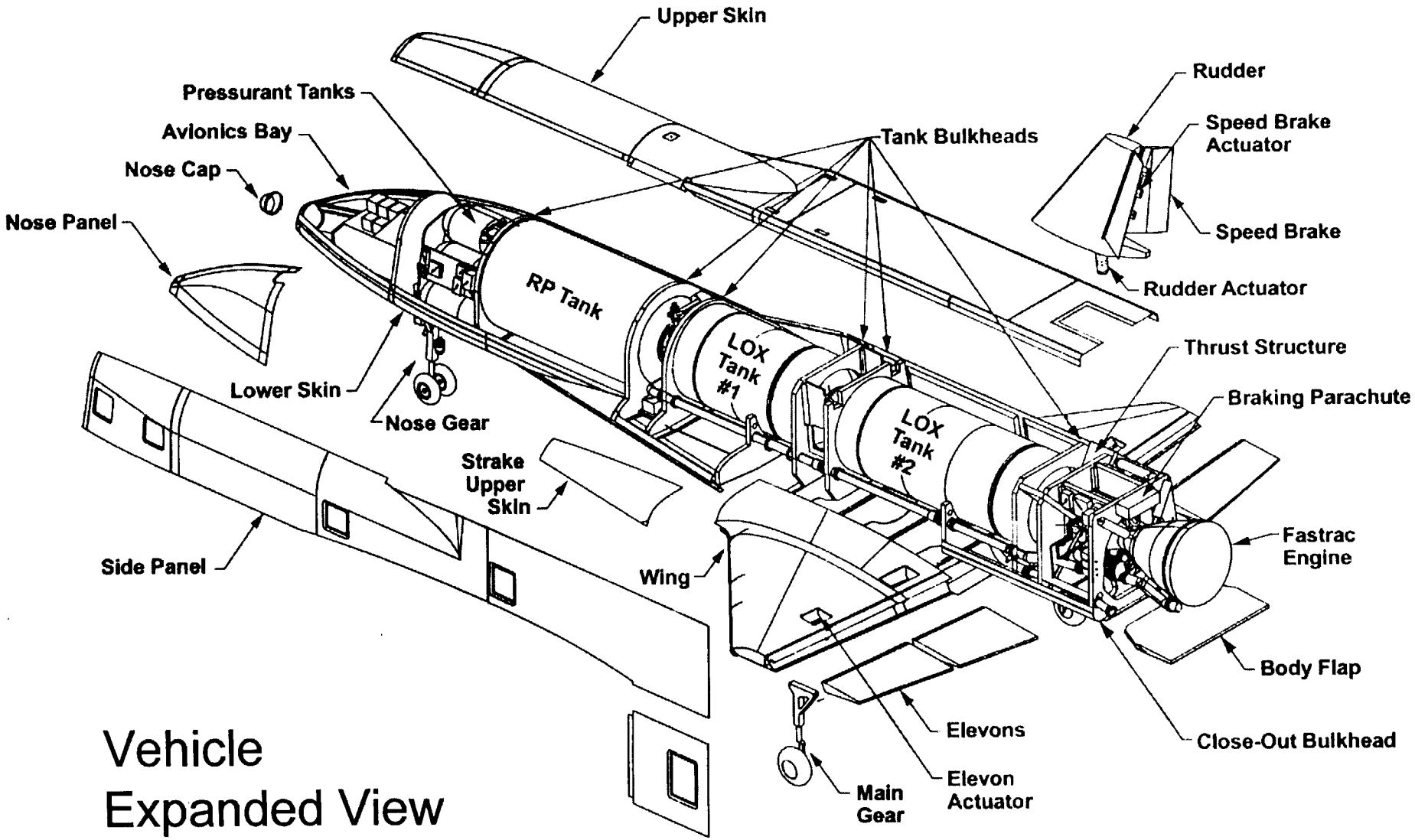
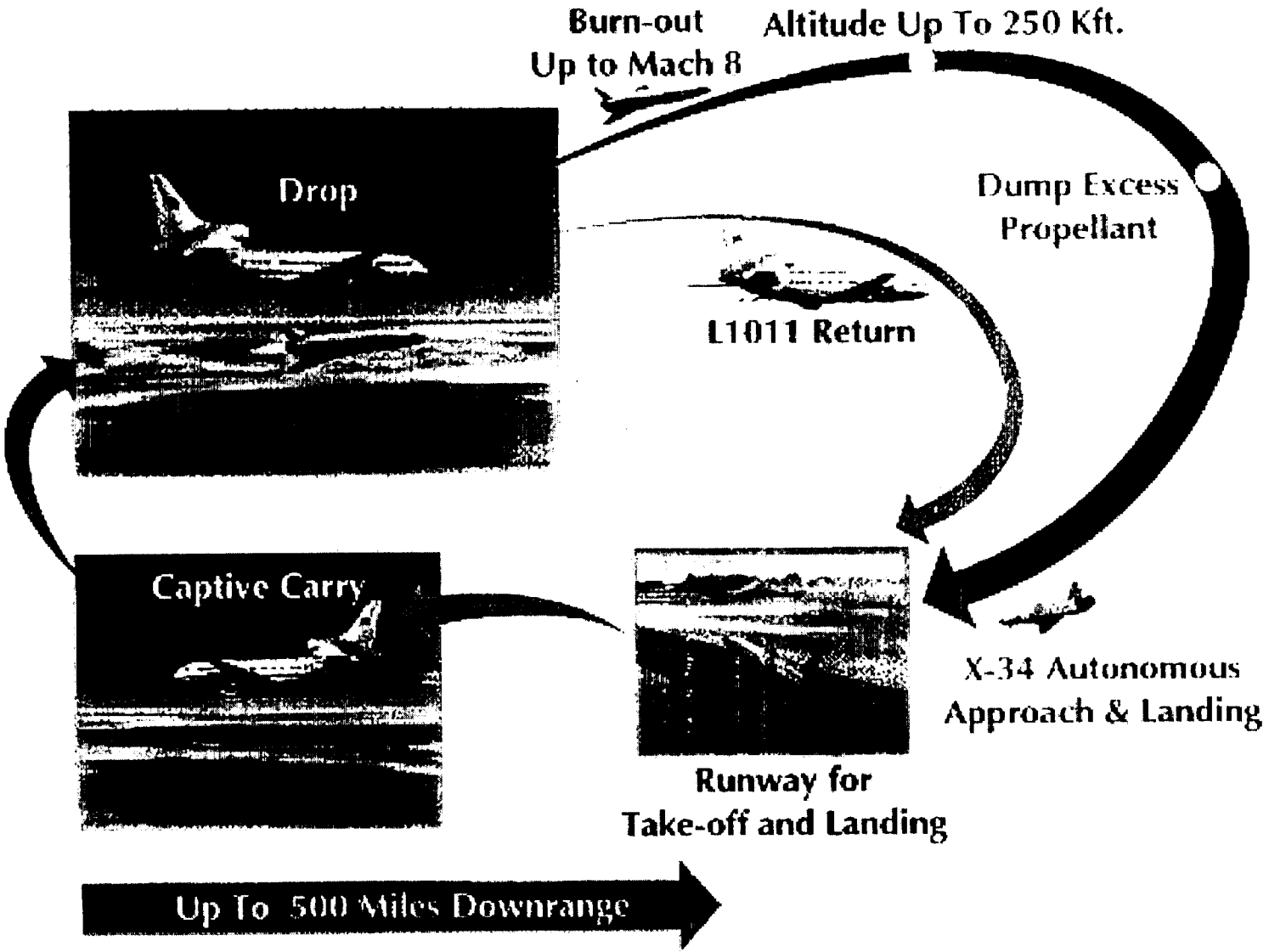


Vehicle
Expanded View

X-34 Project



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X-34 Project

Structures:

- Composite Airframe and Control Surfaces
- Composite Fuel Tank
- A-2 Completed Structural Testing
- Structural Testing of A-1 Vehicle at Orbital (Photo - Early 1999)
- Currently A-2 Vehicle Being Integrated 80%
- Parts In stock for A-3 Vehicle
- A-3 Structure Being Completed

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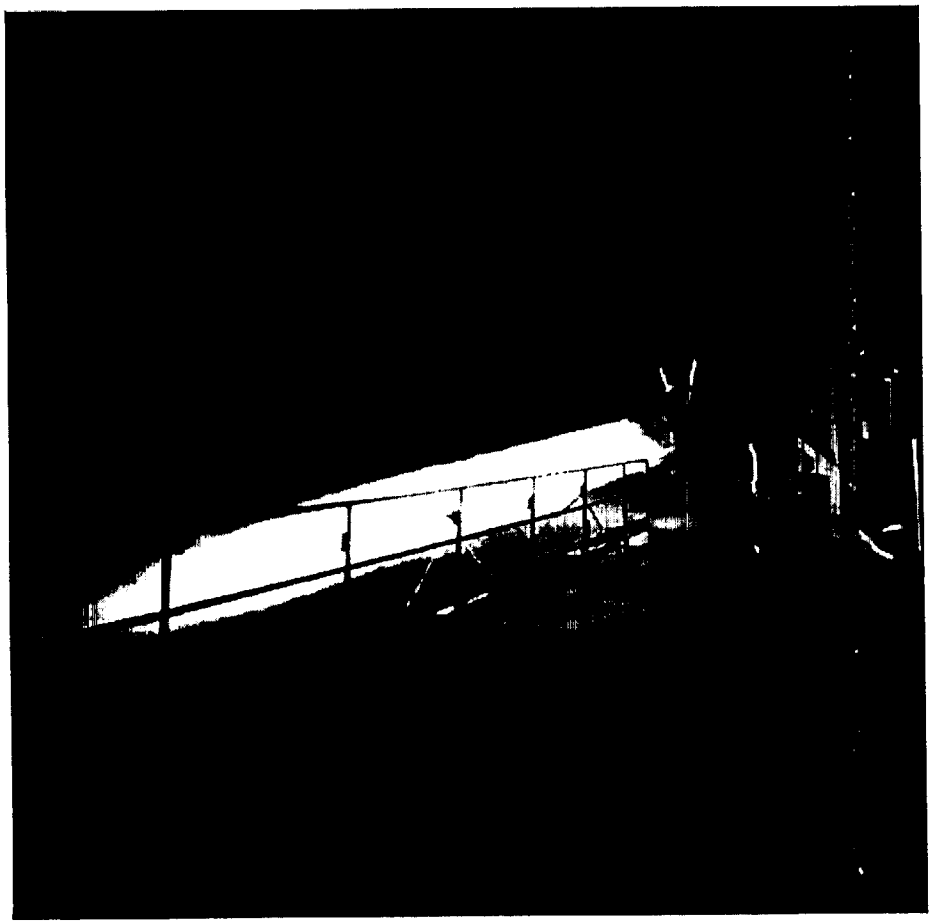
X-34 Project



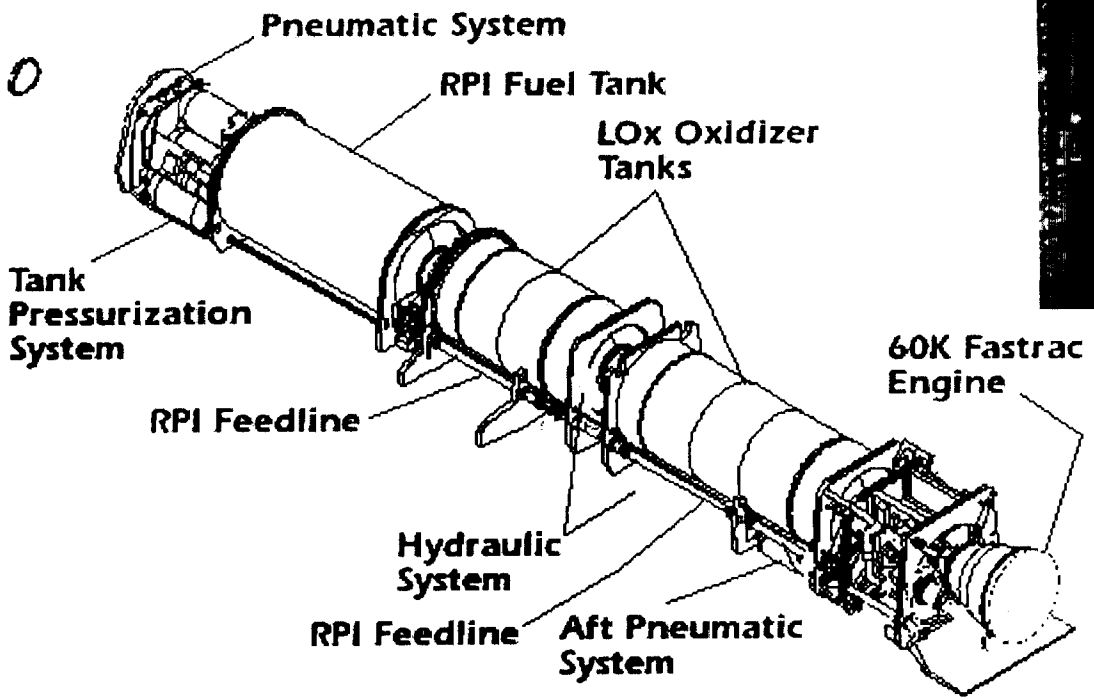
MC-1 (Fastrac) Engine

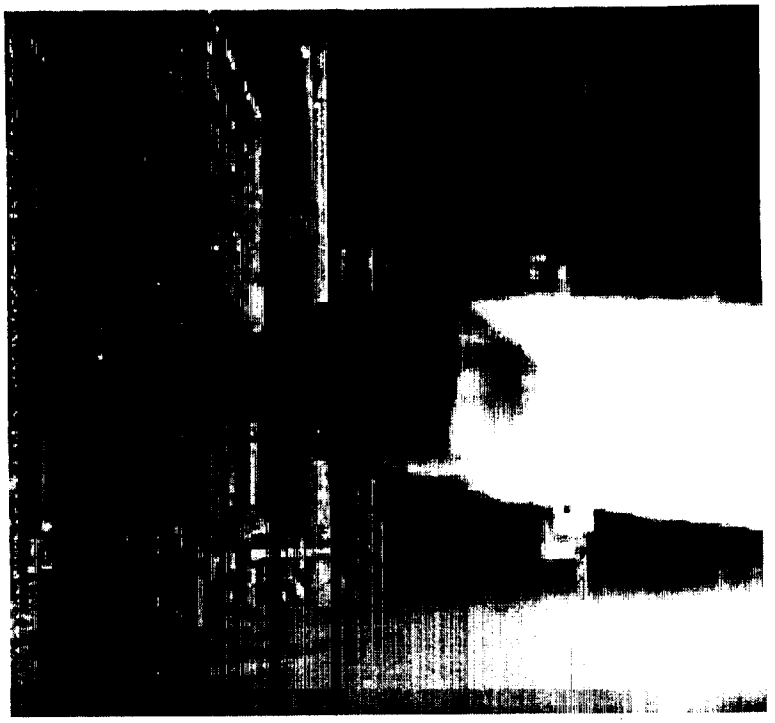
- NASA MSFC Developed
- 60K lbs. Thrust
- Propellants: LOX/RP
- Gas Generator Cycle
- 155 Sec. Burn Time
- 7 Use Lifecycle
- Composite Ablative Nozzle
- 45 Tests to Date
- Testing at SSTF

X-34 Project

Main Propulsion System

- Composite Non-Integral RP Tank
- 2 Aluminum Non-Integral LOX Tanks
- Aircraft Fittings and Cryogenic Insulation





MC-1 Engine

- 60K lbs. Thrust
- Propellants: LOX/RP
- Gas Generator Cycle
- 155 Sec. Burn Time
- Composite Ablative Nozzle
- 7 Use Lifecycle

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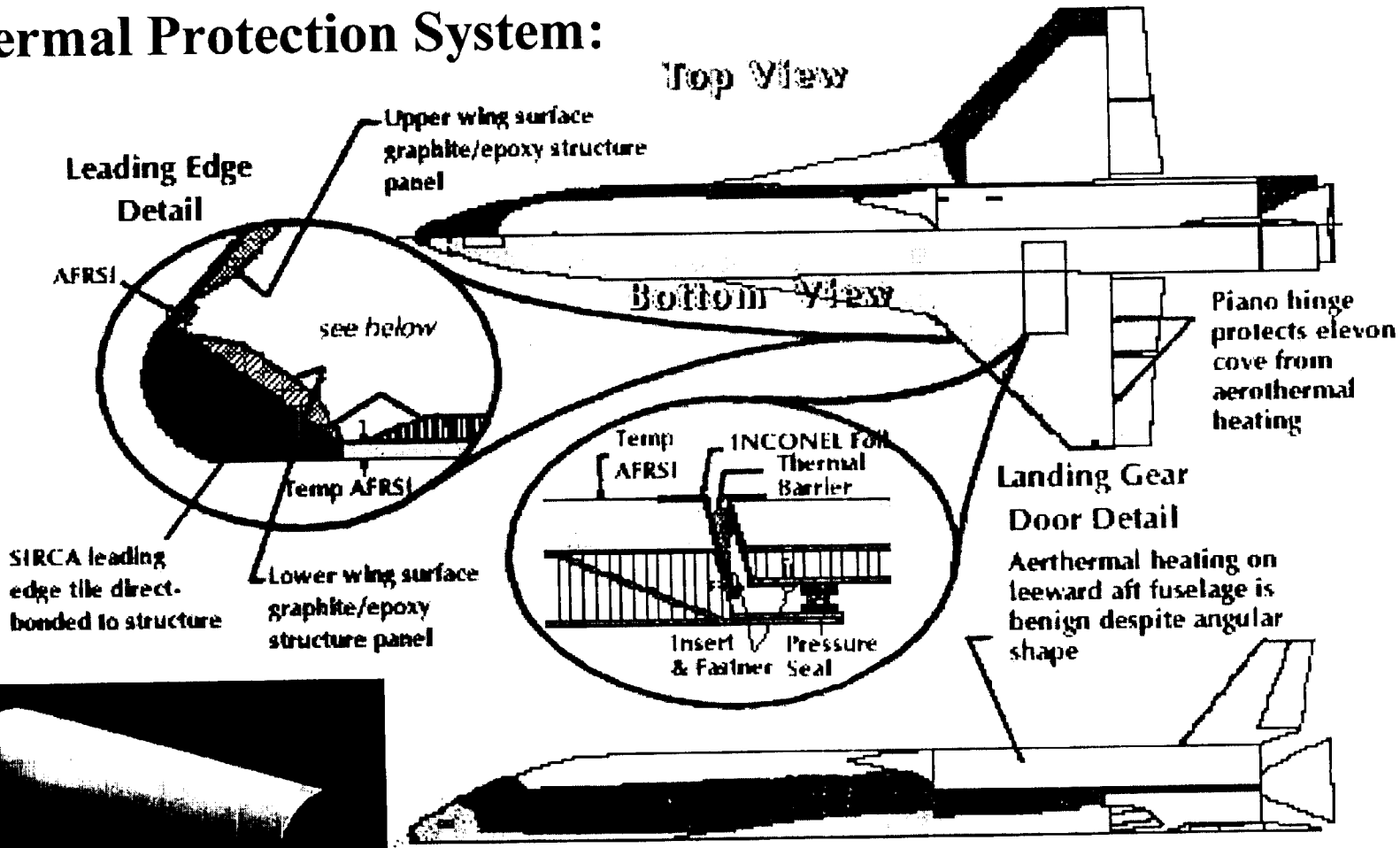
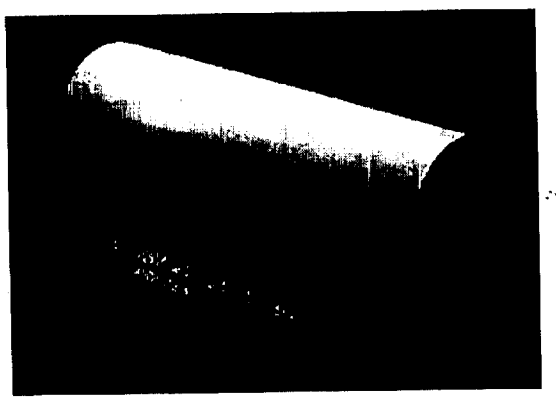
X-34 Project

Thermal Protection System:





- SIRCA Tiles On Leading Edges/Nose Cap
- Windward Blankets

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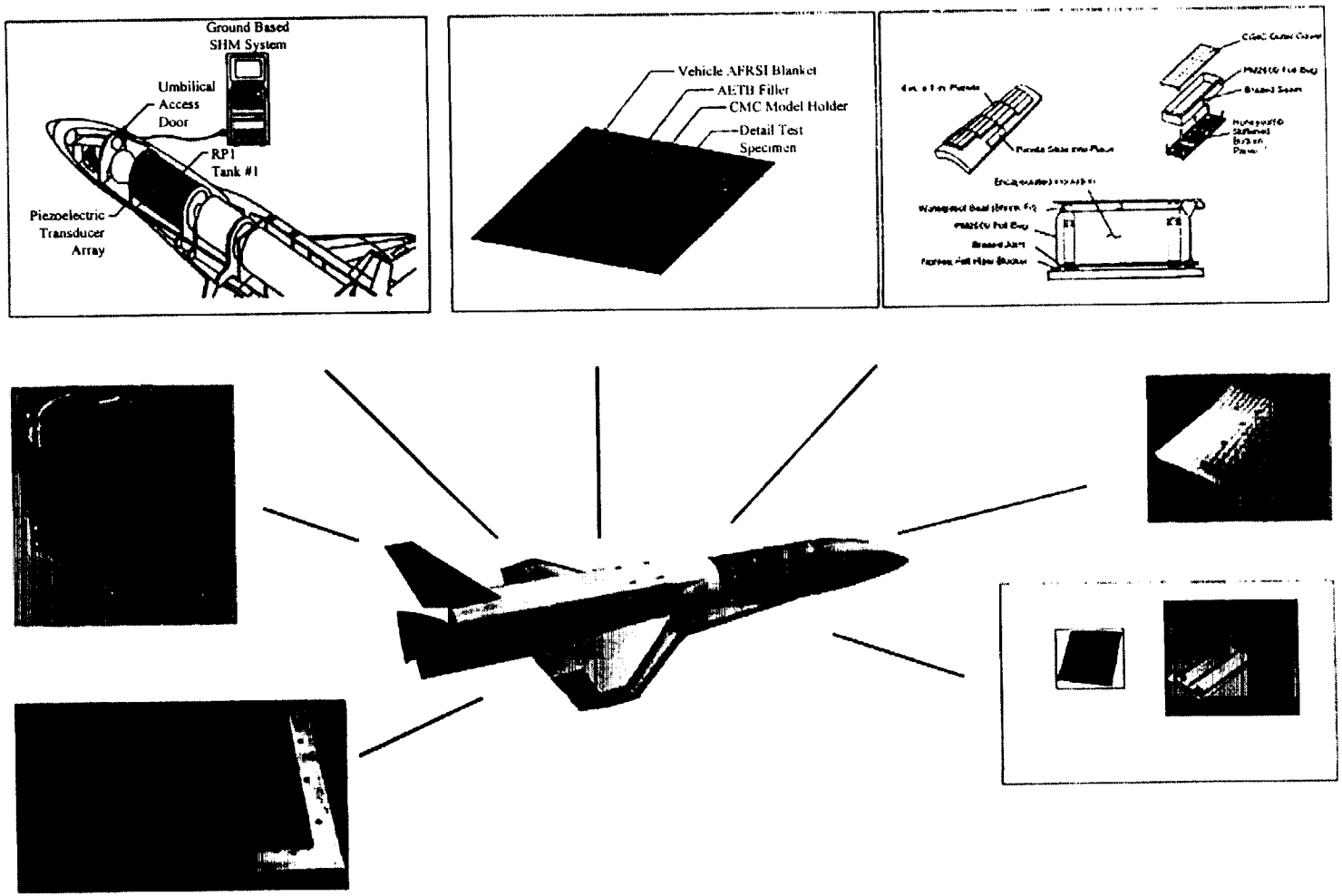
X-34 Project



Vehicle Secondary (TA-2) Experiments

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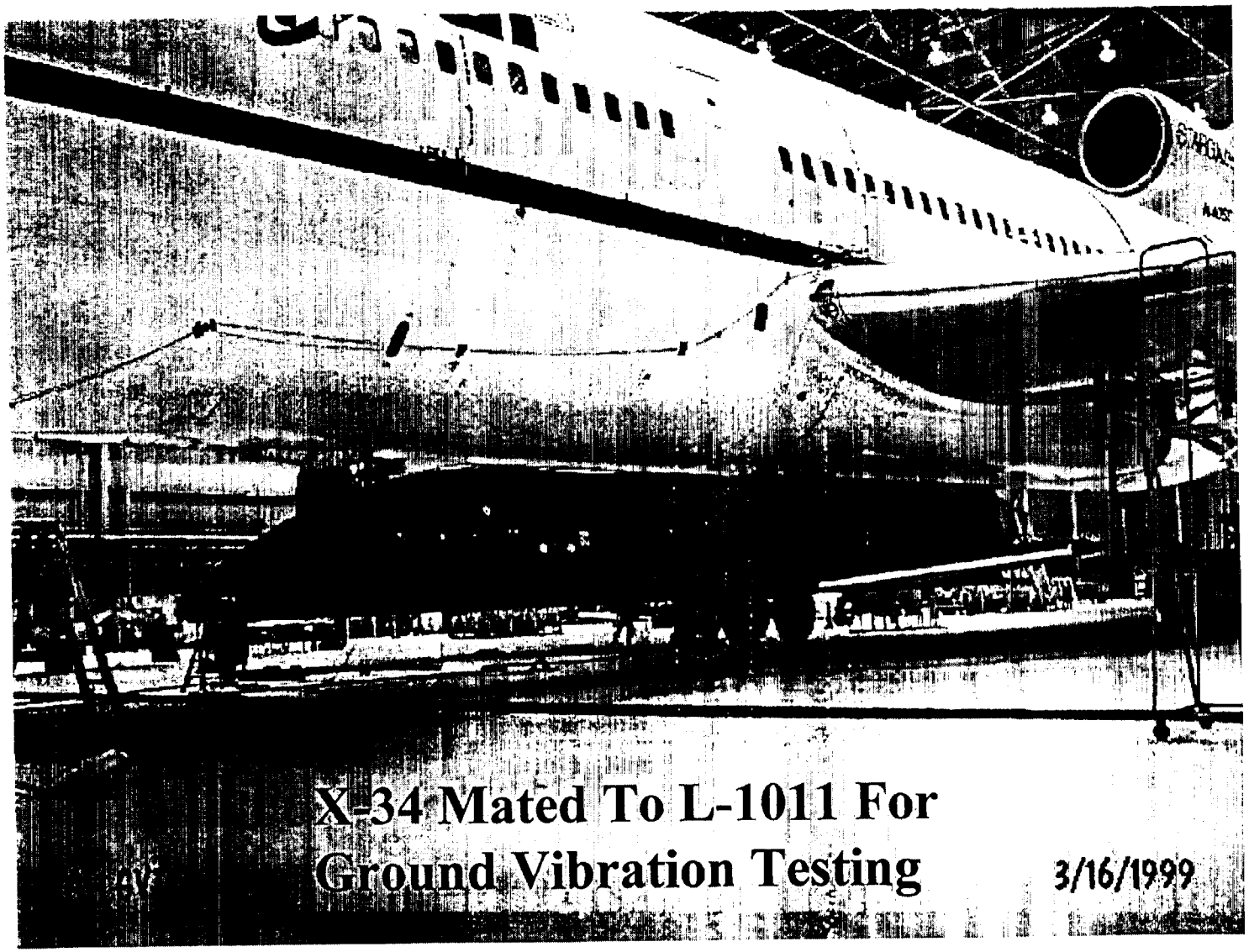
X-34 Project



X-34 Mated To L-1011 For Ground Vibration Testing 3/16/1999

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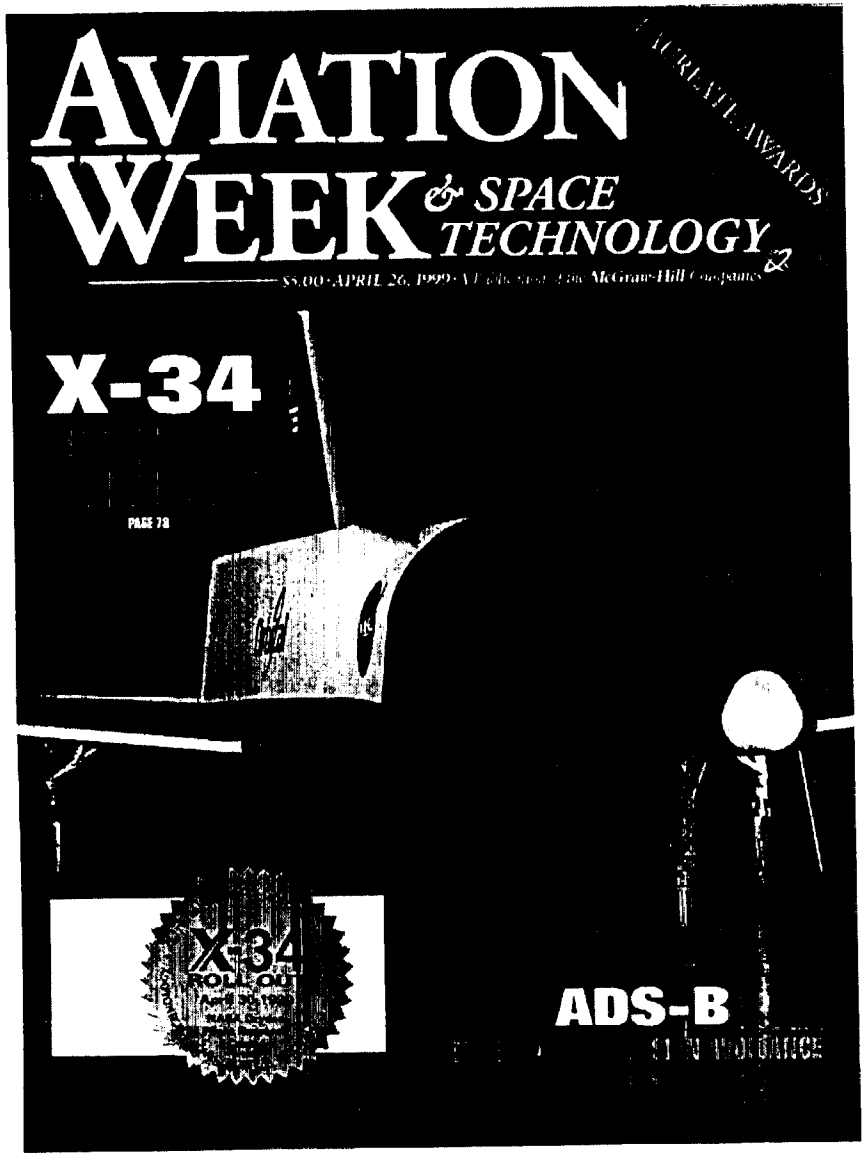

Vehicle Roll Out

April 30, 1999

NASA

Dryden Flight Research Center

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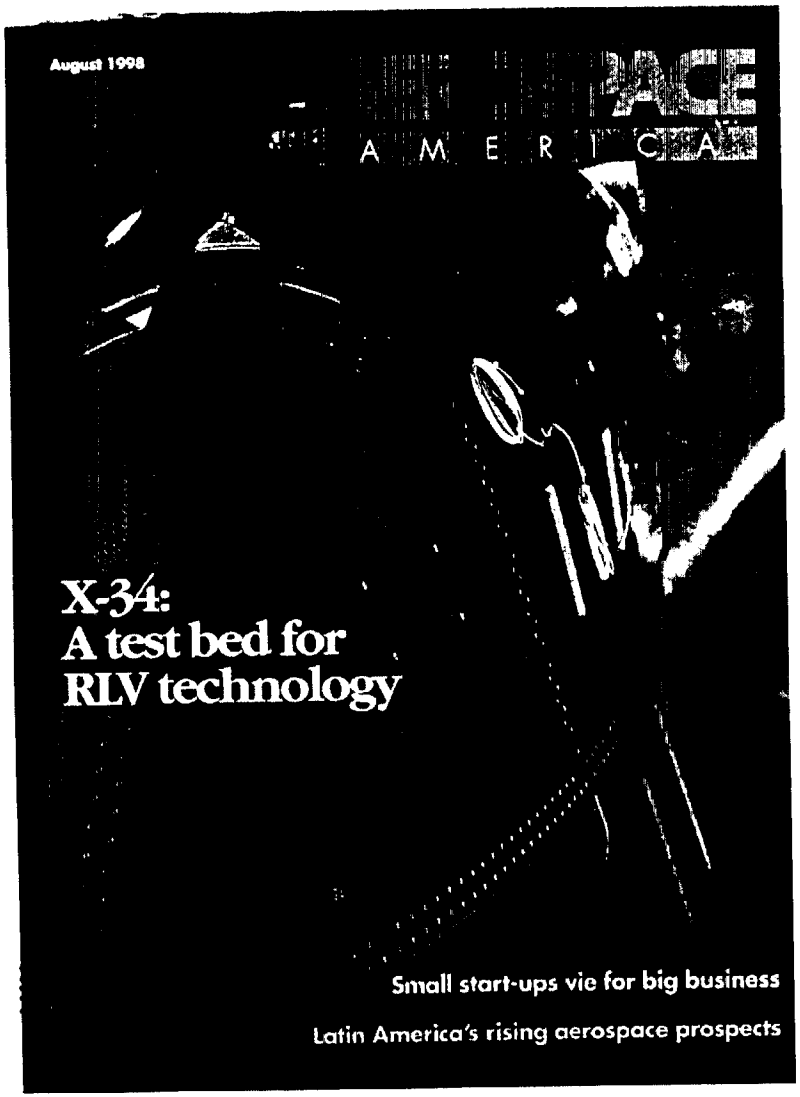
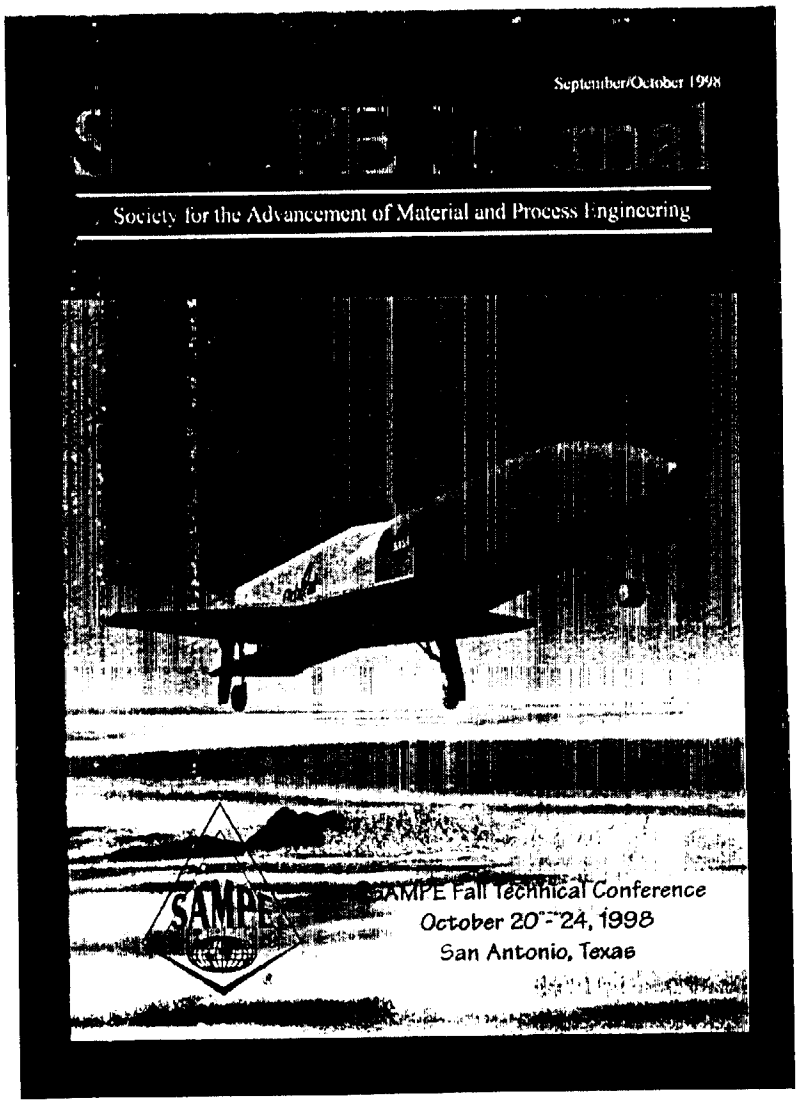
X-34 Project





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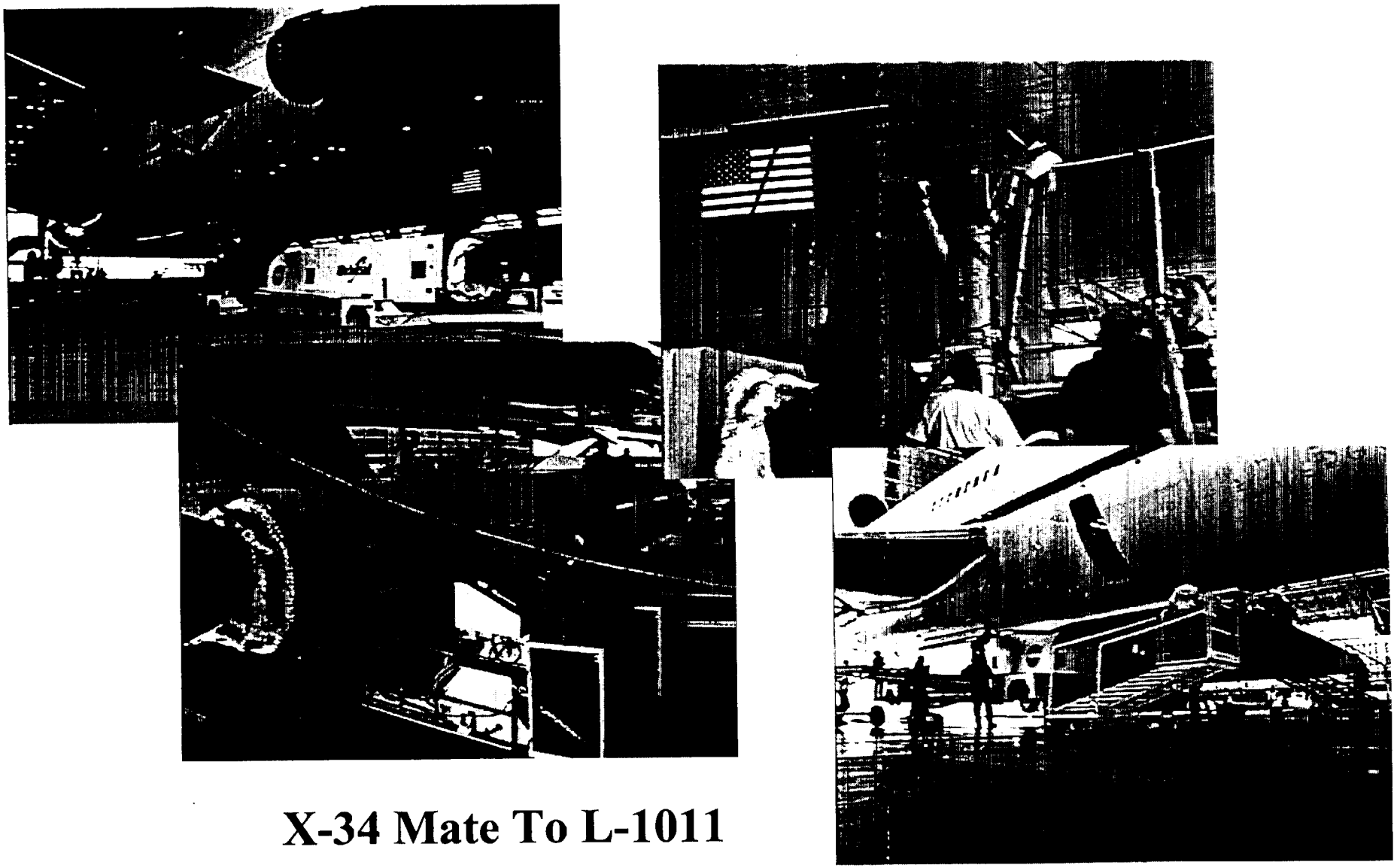

X-34 Mate To L-1011

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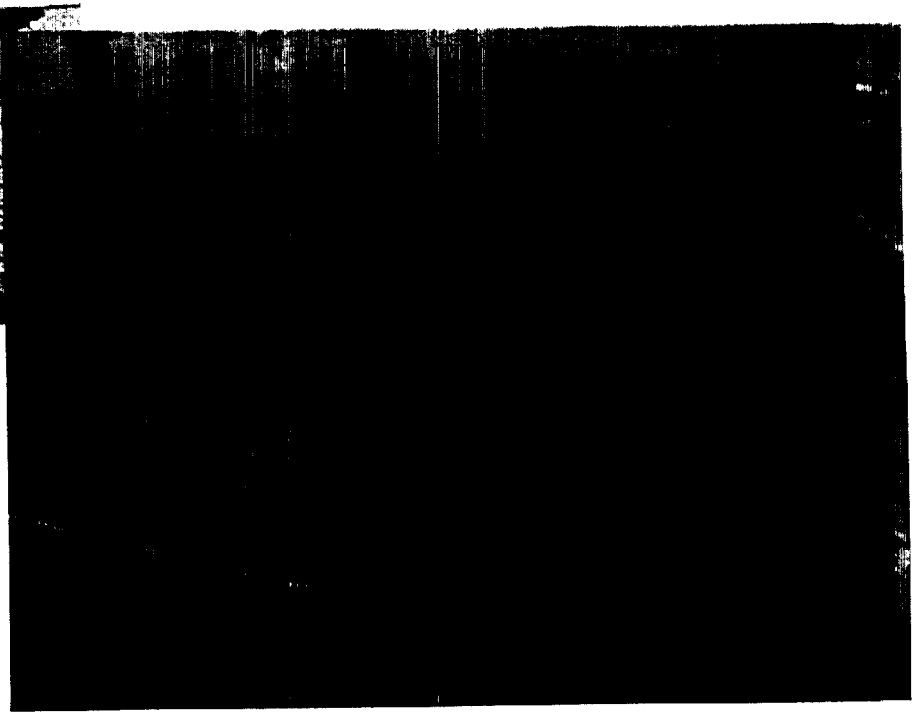
X-34 Project

Captive Carry Flight Testing



Initial Flight:

June 29, 1999
1:12 p.m. - 3:02 p.m. EST
at NASA DFRC

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X-34 Project

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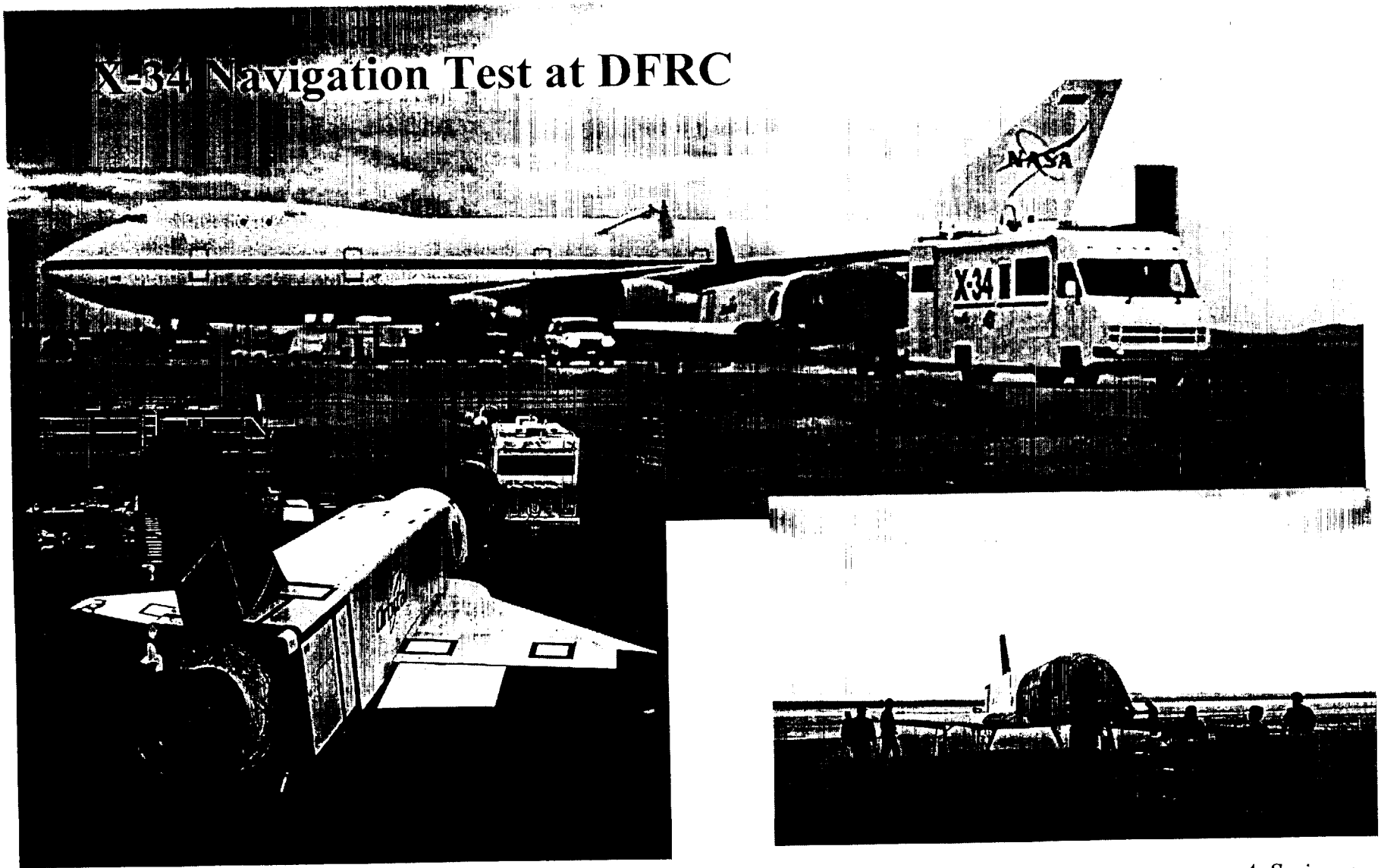
X-34 Project



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X-34 Project

X-34 and L-1011 Carrier Aircraft
On Tarmac at NASA DFRC

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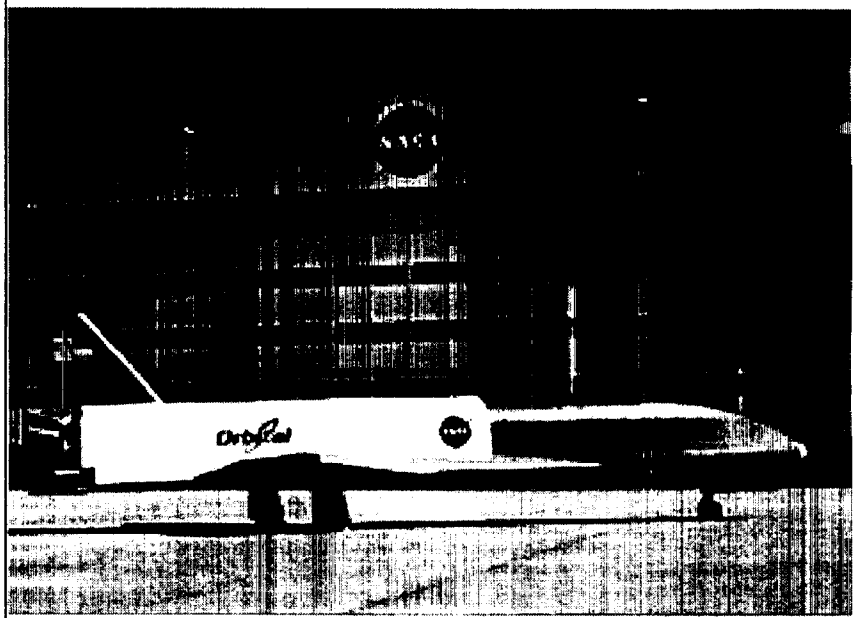
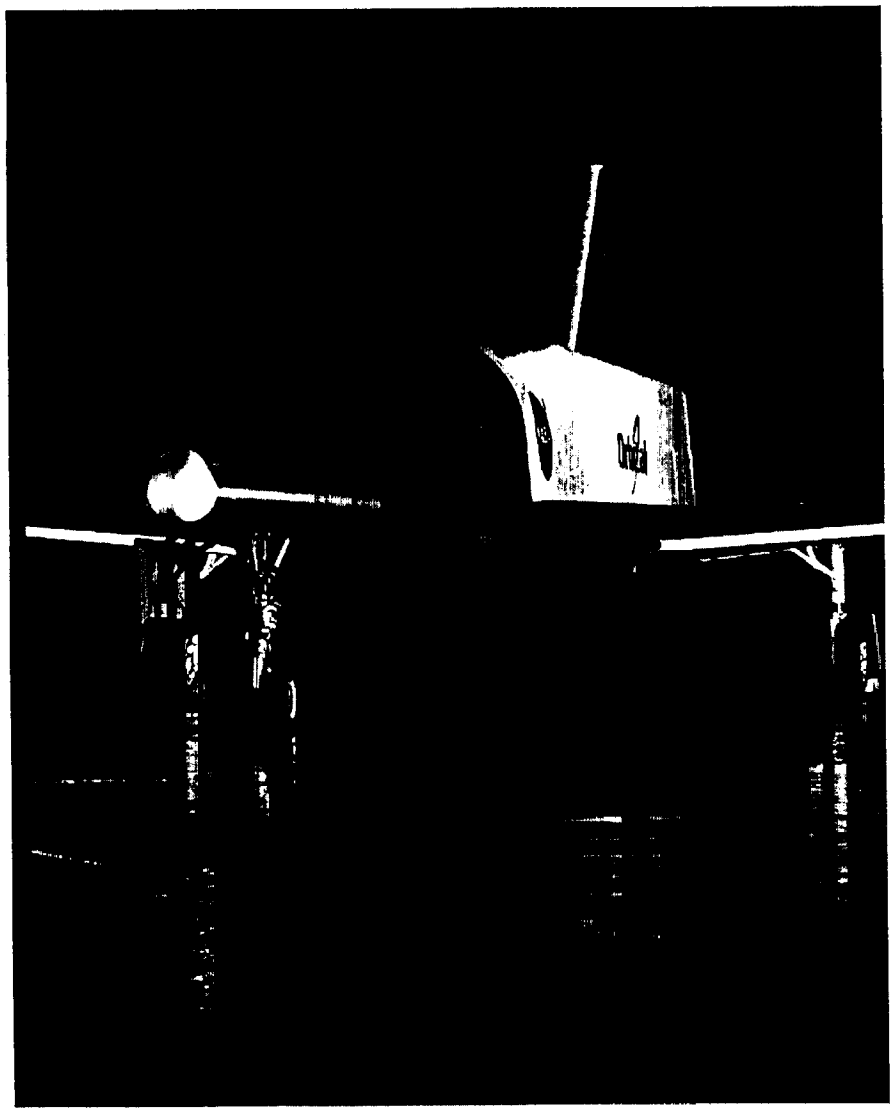
X-34 Project

- **Restructuring effort underway**
  - Possible increase in ground testing for engine and vehicle, avionics mods, and new propulsion test article
- **A-1A unpowered vehicle complete and on the runway at Edwards AFB**
  - Series of high-speed tow tests followed by captive-carry flights underway
- **A-2 powered vehicle 80% complete and undergoing tests at Orbital's Dulles facility**
- **A-3 airframe essentially complete at Orbital's Dulles facility**
- **MC-1 (formally Fastrac) engine testing continuing at Rocketdyne's SSFL in Calif.**
  - 45 hot-fire tests already completed at SSC



X-34 Project



The X-34 Program Demonstrates the Technologies and Operations Required for the Next Generation of Reusable Launch Vehicles